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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/723,894

Filing Date: November 26, 2003

Appellant(s): SALLA ET AL.

John Rariden
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 26 August 2009 appealing from the Office action mailed 27 March 2009.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

US Patent Application Serial No. 10/723,857

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

Bohing et al. PC-Based System for Retrospective Cardiac and Respiratory Gating of NMR Data. *Magnetic Resonance in Medicine*. Vol. 16: p. 303-316. 1990

Keegan et al. Subject-specific Motion Correction Factors for Magnetic Resonance Coronary Angiography. *International Workshop on Medical Imaging and Augmented Reality*. p. 67-71. 2001.

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5,477,144

Rogers

12-1995

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 112

Claims 1-32 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 1-32 recite "motion compensation factors" which were not described in the disclosure in sufficient detail such that one of ordinary skill in the art would be reasonably apprised of how to use and make the claimed invention. The specification lacks any and all specific description of exactly what a motion compensation factor is, or precisely how it is derived, other than the generalized statement that the determination of the factors "may involve modeling the anticipated motion" (Specification p. 18 paragraph 3). For the purposes of further examination herein, Examiner interprets "motion compensation factor" to mean any quality or characteristic related to motion of the imaged objects.

Claim Rejections - 35 USC § 103

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(c), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bohning et al (PC-Based System for Retrospective Cardiac and Respiratory Gating of NMR Data. *Magnetic Resonance in Medicine*. Vol. 16: p. 303-316. 1990), hereinafter Bohning (1990), in view of Keegan et al (Subject-

specific Motion Correction Factors for Magnetic Resonance Coronary Angiography. *International Workshop on Medical Imaging and Augmented Reality.* p. 67-71. 2001), hereinafter Keegan (2001).

Bohning (1990) teaches a method and system of NMR imaging including means and steps for acquiring motion data for the heart and lungs or diaphragm ("two or more types of organs", wherein both the lungs and diaphragm constitute respiratory organs) using one or more types of electrical or non-electrical sensors separate from the imaging device, wherein the image and motion data are concurrently acquired, as well as means and steps for processing the motion data to extract two retrospective gating points, processing the image data based on the gating points, and displaying or storing an image accordingly (Abstract, p. 304 paragraph 1, p. 306 paragraph 6). Although Bohning (1990) does not expressly teach means and steps for reconstructing the image data, such elements and steps are considered to be inherent to the reference as it would not otherwise be possible to display the NMR data as the reference teaches.

Bohning (1990) does not teach means and steps for extracting a compensation factor from the motion data, or for using such compensation factor to process the image data. In the same field of endeavor, Keegan (2001) teaches that the derivation of a subject-specific motion correction factor from diaphragm motion data is useful for more accurately correcting image data for motion artifact (Abstract). It would have been obvious to one of ordinary skill in the art at the time of invention to have modified Bohning (1990) to include the elements, steps and computer routine of Keegan (2001) for calculating a motion compensation factor from the motion data and processing the images according to such factor, in view of the teachings of Keegan (2001).

Claims 9-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bohning (1990) and Keegan (2001) in view of Rogers (US Patent No. 5,477,144), hereinafter Rogers ('144), previously of record.

Regarding claims 9-24, Bohning (1990) and Keegan (2001) teach all features of the present invention as previously discussed for claims 1-8. Bohning (1990) and Keegan (2001) do not provide non-electrical sensors for acquiring the cardiac motion image data.

In the same field of endeavor, Rogers ('144) provides a method and system for retrospectively-gated cardiac MR imaging with motion artifact correction, including the synchronization of respiratory motion data with cardiac motion data, as acquired by a pressure transducer, an acoustic microphone, a piezoelectric crystal transducer, all of which are non-electrical (col. 5 lines 53-63). It would have been obvious to one of ordinary skill in the art at the time of invention to modify the method and system of

Bohning (1990) and Keegan (2001) to substitute the non-electrical cardiac motion sensors provided by Rogers ('144), in order to minimize interference between the imager and cardiac sensors.

Regarding claims 25-32, the combination of Bohning (1990), Keegan (2001) and Rogers ('144) as applied to claims 9-24 would yield the claimed invention having both electrical and non-electrical cardiac motion sensors if the sensors of Rogers ('144) were included with, instead of substituted for, the sensors of Bohning (1990) and Keegan (2001). It would have been obvious to one of ordinary skill in the art at the time of invention to augment the system and method of Bohning (1990) and Keegan (2001) by adding the non-electrical sensors of Rogers ('144) in order to obtain additional motion data to confirm the results obtained by the electrical sensors of Bohning (1990) and Keegan (2001).

Double Patenting

Claims 1-16 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8 and 17-24 of copending Application No. 10/723,857. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the instant application are merely broader than those of the co-pending application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 17-32 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 17-32 of copending Application No. 10/723,857, in view of Rogers (US Patent No. 5,477,144). Although the conflicting claims are not identical, they are not patentably distinct from each other. Claims 17-32 of the co-pending application recite all limitations of claims 17-32 of the present invention, with the exception of specifying that the imager is an MR system and that the non-electrical sensor(s) is used to acquire cardiac motion data. In the same field of endeavor, Rogers ('144) teaches a system and method for retrospectively-gated cardiac MR imaging, using non-electrical sensors to acquire cardiac motion data (col. 5 lines 53-63). It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system and methods of the co-pending application to employ an MR imager and non-electrical cardiac sensors, in order to eliminate interference between the magnetic field and the sensors, in view of the teachings of Rogers ('144).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

(10) Response to Argument

Regarding the rejection of claims 1-32 under 35 U.S.C 112, first paragraph, Appellants contend that the rejection is improper because the term “motion compensation factor” is sufficiently enabled by the specification (Brief p. 43). Specifically, Appellants point to page 18, line 24 – page 19 line 3 of the present specification as adequately supporting and describing the term. At such passage, the disclosure only sets forth possible broad means by which the factors “may” be determined, for example using “a priori data” or “iterative algorithms”. Examiner maintains that such description is extremely vague to the extent that a skilled artisan would be unable to make and use the claimed invention without undue experimentation. .). The disclosure of “using a priori data” only tells one of ordinary skill that the factor is derived using information that is “previously known”, which is in itself vague and unclear. Appellant additionally fails to disclose any specific algorithm that, when employed, would produce a “motion compensation factor”—the mere recitation of “iterative” does not indicate to a skilled artisan a clear set of instructions that, when followed, would produce the inventive compensation factor. Furthermore, the term “motion compensation factor” does not have such a standard, commonly known definition in the art that a skilled artisan would readily understand what is meant by the term. In other words, the specification fails to even describe the factor in such detail that a skilled artisan would understand what is meant by the term (i.e., whether it is a mathematical variable, a constant numerical value, a qualitative consideration, etc.). Accordingly, the specification is in indeed completely non-enabling for the recited motion compensation factor, and the rejection is proper.

Regarding the rejection of claims 1-8 under 35 U.S.C. 103(a), Appellant attacks the rejection by alleging that the combination of references relied upon therein is improper. Specifically, Appellants contend that the rejection fails to show any “objective motivation for combining the Bohning and Keegan references” (Brief p. 48). Appellant relies on the flawed logic that, because Bohning already teaches one type of motion compensation, a skilled artisan would find the reference invention complete and would thus never be motivated to modify Bohning by substituting any other type of motion compensation method or system, such as the one taught by Keegan (Brief p. 48-49). Appellant admits that Keegan “essentially addresses the same problem set forth in the Bohning reference but in a completely different manner”, but attempts to undermine their combination by arguing that since each one “adequately address[es] the issue of motion during image acquisition, there appears to be no objective basis for modifying the Bohning reference as suggested by the Examiner” (Brief p. 51). Appellant provides no precedent case law or otherwise compelling evidence to substantiate the reasoning that, if one reference is

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considered "complete", a skilled artisan would never be motivated to modify such reference. To the contrary, the simple use of a known technique to improve similar devices or methods in the same way, which is what Appellant appears to be arguing here, has been clearly held as obvious and unpatentable over the prior art (*KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1395-97 (2007)).

Appellant also suggests that the combination of teachings as set forth by the Examiner results in a method and system wherein motion compensation factors are used instead of image clustering, whereas the claims would require the factors to be used in combination with such clustering (Brief p. 52). In other words, Appellant characterizes Bohning as teaching only the retrospective gating points, and Keegan as teaching only motion compensation factors, and as such the substitution of Keegan for Bohning results in only motion compensation factors, not both factors and gating as set forth by the claims. As the rejection is not predicated on the substitution of the motion compensation of Keegan for the gating of Bohning, Appellant's arguments have no bearing on the propriety of the rejection. To be clear, the rejection is based on the logic that, since Keegan teaches that cardiac image data can be corrupted by diaphragm motion and one should compensate for that motion accordingly, a skilled artisan would thus be motivated to apply such teaching to improve Bohning by accounting for confounding motion by incorporating a motion compensation factor into the Bohning algorithm. Alternatively, a skilled artisan might also be reasonably motivated to perform the method of Bohning and then subsequently validate the results of such method by performing that of Keegan in order to ensure that diaphragm motion did not obscure the image clustering results, which would also meet the claims.

Regarding claims 17-24, Appellant again attacks the combination of Bohning and Keegan relied upon in the previous rejection. The reasoning set forth above to show the propriety of their combination in the rejection of claims 1-8 applies similarly to Appellant's arguments for claims 17-24.

Regarding claims 9-16 and 25-32, Appellant contends that the prior art of record fails to meet the claims because the references purportedly lack "concurrent use of both electrical and non-electrical sensors" (Brief p. 54). Examiner notes that the claims do not recite "concurrent" use of both types of sensors, and therefore Appellant's arguments have no bearing on the propriety of the rejection.

Appellant further argues that, because Rogers "appears" to teach non-electrical sensors as being *an alternative to* electrical sensors, a skilled artisan would never be motivated to use non-electrical sensors *in addition to* electrical sensors (Brief p. 55). Examiner maintains that a skilled artisan would not require an explicit teaching of using both sensors in order to be motivated to actually do so; it is well known in the field of scientific investigation to collect data using both variable and control means in order to validate the results of the variable method. In this particular instance, it is also well known that

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electrical sensors can be vulnerable to interference from imaging signals, and therefore it would be quite logical to a skilled artisan to additionally collect data using non-electrical sensors in order to validate the electrical sensor results. Such a modification would require nothing more than the mere combination of known prior art elements according to known methods to yield predictable results, which has clearly been held as obvious and unpatentable (*KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1395-97 (2007)).

(11) Related Proceeding(s) Appendix

Copies of the court or Board decision(s) identified in the Related Appeals and Interferences section of this examiner's answer are provided herein.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Parikha S Mehta/
Examiner, Art Unit 3737

Conferees:

/BRIAN CASLER/
Supervisory Patent Examiner, Art Unit 3737
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